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Spring 5-8-2020

Improving Outcomes for Patients with OSA Receiving Anesthesia

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<center>**Executive Summary**</center>

Introduction of the Problem

Obstructive sleep apnea (OSA) is a chronic disease that is rising in prevalence, afflicting 29.4 million Americans or 12% of the U.S. population (AASM, 2017). OSA is characterized by intermittent and recurrent episodes of partial or complete obstruction of the upper airway during sleep and is associated with numerous health risks (Vasu, Grewal, & Doghramji, 2012). Unfortunately, OSA remains highly under recognized with evidence suggesting that 80-90% of people living with OSA remain undiagnosed (Finkel et al., 2009; Gammon & Ricker, 2012). In spite of such evidence, numerous hospitals across the country have yet to adopt protocols to screen patients for OSA (Aurora et al., 2010). This is especially concerning for patients scheduled for surgery because sedation, anesthesia, and opioids have been shown to worsen sleep apnea in the perioperative period, leading to an increase in the rate of perioperative complications (Vasu, Grewal, & Doghramji, 2012).

A 137-bed general, acute care hospital located in Illinois that provides care for patients at risk for OSA, had no standing preoperative protocol to screen surgical patients for OSA. The providers at this site were seeking evidence-based guidelines to improve the way they managed patients with OSA. Stakeholders at the facility requested an evidence-based screening technique to identify surgical patients preoperatively with OSA and recommendations to guide perioperative treatment once these patients had been identified.

Literature Review

OSA is a chronic disease that is rising in prevalence. A global study was conducted in 2018, by an international panel of researchers seeking to provide a clear scope of the impact of OSA worldwide. Their analysis indicated that sleep apnea impacts more than 936 million people

worldwide, which is nearly 10 times greater than the previous estimation of OSA prevalence (100 million) which came from a World Health Organization study in 2007 (Benjafield et al., 2018). This new study demonstrated the need for expanded awareness around the diagnosis and treatment of OSA worldwide. This high population of unrecognized individuals contributes to numerous patients undiagnosed, unidentified, and improperly treated for OSA when presenting for surgery (Baugh, 2013; Opperer et al., 2016).

Evidence indicates that patients with OSA whom remain undiagnosed at the time of surgery have an increased rate of postoperative hospitalizations, an increased need for intensive care interventions, and prolonged lengths of hospital stay (Corso & Gregoretti, 2013). Increased risk for injury occurs when anesthesia is used in conjunction with surgery because sedation increases the upper airway's collapsibility, which heightens the risk of postoperative complications (Vasu, Grewal, & Doghramji, 2012). Determining the presence and severity of OSA before initiating surgical therapy, therefore, has been set as a standard by many institutions, including the American Academy of Sleep Medicine (AASM, 2017) and is supported substantially by clinical evidence and research.

A meta-analysis that reviewed over 40 observational studies and clinical practice guidelines concluded that undiagnosed OSA in preoperative patients can lead to unplanned postoperative admissions, increased lengths of stay, and even more detrimental outcomes such as death (Dolezal, Cullen, Harp, & Mueller, 2011). In 2014, a cohort study conducted over a nine-year span, including over 19,000 patients, sought to investigate whether a preoperative diagnosis of OSA reduced post-operative risks and complications. They concluded that the risk of cardiovascular complications, primarily cardiac arrest and shock, was significantly higher in patients undiagnosed with OSA preoperatively versus patients who were (Mutter et al., 2014).

Physical harm to the patient is not the only complication associated with undiagnosed OSA. The American Academy of Sleep Medicine (AASM) calculated that the annual economic burden of undiagnosed sleep apnea among U.S. adults is approximately 149.6 billion dollars (AASM, 2017).

Throughout the literature, use of the STOP-BANG questionnaire as an effective, easy to use, and highly sensitive tool for perioperative screening for OSA is identified (Chiu et al., 2016; Dolezal et al., 2011; Lakdawala, Dickey, & Alrawashdeh, 2018). The STOP portion of the questionnaire refers to snoring, tiredness, observed pauses in breathing, and high blood pressure (Nappa, Wong, Singh, Wong, & Chung, 2017). The BANG portion of the questionnaire was later added to cover four additional patient demographics and refers to body mass index, age, neck circumference, and gender (Nappa, Wong, Singh, Wong, & Chung, 2017). Patients with a STOP-BANG score of 0-2 can be classified as low risk for OSA, those with a score of 3-4 can be classified as intermediate risk of OSA, and those with a score of 5-8 can be classified as high risk for OSA (Nappa, Wong, Singh, Wong, & Chung, 2017).

A systematic review published in the Journal of Peri-Anesthesia Nursing, discovered that when used in tandem with the clinical practice guidelines of the American Society of Anesthesiologists, the STOP-BANG questionnaire identified 83.6% of patients with mild OSA, 90.2% of patients with moderate OSA, and 100% of patients with severe OSA (Dolezal et al., 2011). A qualitative improvement project using the STOP-BANG tool was implemented in a 517-bed academic center in 2018. The STOP-BANG screening tool was chosen because it was inexpensive, quick and easy to use, and was effective in alerting care providers of the risk for moderate and severe OSA (Lakdawala, Dickey, & Alrawashdeh, 2018). Results suggested that surgical patients who received anesthesia, and scored a 5 or greater on the STOP-BANG

screening tool were more likely to have oxygen desaturations of less than 90% and were more likely to require pulse oximetry monitoring with supplemental oxygen for more than 24 hours (Lakdawala, Dickey, & Alrawashdeh, 2018). In 2018, a retrospective chart analysis was conducted reviewing 150 charts over a three-month period. Of the 150 charts reviewed, 58% of those screened as high risk for OSA had postoperative complications including hypoxemia and acute hypercapnia (Legler, 2018). Due to the support from numerous, recent evidence-based studies, the STOP-BANG questionnaire was presented to the facility stakeholders as the best option for this project.

Methodology

This project was implemented at a 137-bed general, acute care hospital located in Illinois. After much collaboration between team members, the method for implementation was determined. The first step of this project was to provide evidence-based education to the staff. Staff present for project implementation included 10 participants; a combination of surgical techs, nurses, surgeons, and CRNAs. Using a PowerPoint presentation, the staff was educated on various aspects of identifying a patient with OSA using the STOP-BANG questionnaire. The second step of this project was to create a universal way to effectively communicate the patient's OSA status to all providers who would be a part of this patient's care. In collaboration with staff, it was determined that surgical patients who scored high risk for OSA on the STOP-BANG questionnaire, would have their chart tagged with a specific marker. The goal of this intervention was to help all providers deliver patient-specific care. This evidence based, patient centered care plan included decreased administration of opioids, a multi-modal pain management approach, longer and more thorough monitoring in the postoperative recovery unit, and the use of a continuous positive airway pressure device (CPAP) when needed in recovery. In addition,

patients who scored high risk for OSA would receive a referral to the in-house Sleep Lab to obtain a formal diagnosis and treatment plan. The goal was to not only identify patients with OSA, but to also provide them with a means for follow up in order to confirm their diagnosis and seek treatment options.

Evaluation

Various evaluations were performed to assess the effectiveness of this project. The first step of evaluation came from a simulation experience that occurred immediately after the educational Power Point presentation. In the simulation, staff members were presented with examples of potential surgical patients and were asked to identify those with OSA using the STOP-BANG questionnaire. The experience was monitored to identify how successful staff members were at correctly identifying patients with OSA. Every participant was able to correctly identify the simulated patients who were at high risk for having OSA. Since participants could correctly identify patients with OSA in simulated practice, it is reasonable to assume that they could complete the same task in a real-life situation.

The project was also evaluated using an Evaluation Survey developed based on the literature and in collaboration with the stakeholders. The goal of the survey was to understand the participants' opinions of the effectiveness of the project and the likelihood the project would be implemented in the future. The first seven questions on the survey evaluated whether the education provided during the presentation was sufficient for the staff to begin using the OSA screening tool. The survey also offered space for the participants to provide open ended feedback regarding ways to improve the project. The survey was administered following the education and simulation portion of the presentation.

Ninety percent of participants agreed that the educational objectives were achieved; they perceived they could now identify OSA in surgical patients and that they were confident in performing an assessment using the STOP-BANG questionnaire. All participants indicated that as a result of attending the meeting they had a better understanding of OSA, and they could now define it. The next section of the evaluation form focused on the participants' opinions of the value they see in the project as a result of the information they obtained during the meeting. Ninety percent of the participants agreed that this project would positively impact their job performance and 100% of participants reported they gained specific tools that they could use to implement in their own area of practice. In the third portion of the evaluation form, participants were asked to agree or disagree with seven statements that concentrated on whether staff members would implement the project and if they believed it could be successful. All participants agreed that they will adjust their plan of care if OSA is identified and that this project will make a difference in the lives of their patients.

The last portion of the evaluation survey consisted of open-ended questions, which gave the participants an opportunity to provide opinions and feedback. When asked if there were barriers present to prevent the providers from implementing the project, 60% of participants answered "no". However, others suggested that the potential cost of testing, and issues with insurance coverage and patient compliance could be possible barriers to project completion. When asked if there was any way to make this process easier or more efficient, 70% of participants responded "no". Other participants, however, suggested incorporating the questionnaire into new patient paperwork or prescreening documents. Moreover, participants felt that follow up with management would be necessary prior to the questionnaire being used. When asked what changes could be made to this project, 90% of participants said none. One participant

proposed referring patients to the in-house sleep lab at Touchette Hospital and this suggestion eventually impacted change into the project plan as described below.

Initially, the plan was to refer patients identified with OSA to the SIUE WE CARE clinic for treatment. The clinic is located nearby, in East St. Louis, and is run by a nurse practitioner who collaborated on this project. After the proposal was made to refer patients to the in-house sleep lab, our plan of action changed. The new goal was to coordinate referrals and follow-up appointments with the Sleep Lab located in-house at Touchette Hospital. Identifying the number of people who were correctly referred to the Sleep Lab at Touchette Hospital could have been part of the evaluation process. Unfortunately, no patients have been referred to the Touchette Sleep Lab because no provider at the facility has agreed to hold the responsibility of writing the orders for referral. Finally, the project can be evaluated on whether or not it was adopted into practice. Unfortunately, the STOP-BANG questionnaire is not currently in use at Touchette Hospital.

There were several limitations present at this site that slowed, and eventually stopped the project's progress and success. Limitations and barriers included: lack of availability and support from stakeholders, inability to get all needed parties for project's success committed to the project at the same time, difficulty in securing permission from upper management for the questionnaire to be used, challenges in finding a provider to agree to placing an order for patient referral to the sleep lab, lack of consistency in staff and surgery schedules, and a limited patient population. While all of these obstacles hindered the completion of this project, there was one significant challenge that was unable to be overcome. Several months after implementation, the SIUE SRNA program greatly reduced their student involvement at the hospital. As a result, any

current momentum in moving forward with the STOP-BANG questionnaire was put on hold until further notice

Impact on Practice

The immediate impact that this project had on the clinical site was the knowledge and awareness gained by the site's providers. Prior to the implementation of my project, many providers were unaware of the deleterious effects of OSA and how it influences the patient and providers in the surgical setting. Through this project the providers were made aware that OSA screening protocols have become standards of care in most neighboring hospitals, and this knowledge encouraged them to want to provide the same evidence-based type of care for their patients. Once upper management learned of this project, they too became aware of the need for their institution to adopt a screening protocol for OSA. Through this project, providers at this site were also given skills that will help improve their individual practice. In an effort to provide patient-centered care, these skills include specific interventions and treatment options for patients with OSA. Finally, the director of the facility's new sleep lab was especially motivated and eager to adopt the screening protocol. This Director had been looking for ways to gain referrals for his department and before learning of this project, he had not yet considered the idea of identifying them through a pre-operative surgical assessment such as the STOP-BANG questionnaire.

The long-term impact of the project will depend on whether or not a leader emerges to continue the momentum that was started. The institution and its providers have all the tools they need to screen, identify, refer, and effectively manage patients identified with OSA. In order to promote ongoing implementation, it is likely a full-time provider; whether it be a nurse, doctor, or sleep study director; must continually support this project as it is still gradually being adopted.

Since the adoption of the STOP-BANG questionnaire has not yet become a universally used tool at this site, providers need someone there to help them with its use, to answer questions that arise, and to hold the team accountable for using it appropriately. Without a suitable leader, the use of the STOP-BANG questionnaire will not continue.

Conclusions

This regional hospital provides care to an underserved population that lacks preventative and primary care. This makes the pre-operative assessment period an important time to screen for OSA as many of these patients will not come into contact with the health care system again, unless for an additional surgery or emergent event. Using the STOP-BANG questionnaire on surgical patients is an opportunity to identify people who would normally be undiagnosed. While adoption of the STOP-BANG questionnaire has not yet led to a successful patient referral to this facility's sleep lab, the project still resulted in some positive outcomes. Through this project the institution has been given all the tools they need to succeed in screening surgical patients for OSA.